# THE GRID WE NEED TO DECARBONIZE AMERICA

#### Jesse D. Jenkins

June 13th, 2023 – Electricity System Integration Group Long-term Load Forecasting Workshop

The full financial might of the federal government is now aligned behind the clean energy transition

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# The Infrastructure Law and Inflation Reduction Act put clean energy\* on sale

\* (and other climate solutions)

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Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks) billion metric tons CO<sub>2</sub>-equivalent (Gt CO<sub>2</sub>-e)<sup>1</sup>



1 - CO<sub>2</sub>.equivalent emissions calculations use IPCC AR4 100 year global warming potential as per <u>EPA Inventory of Greenhouse Gas Emissions and Sinks</u>. Data source: "Preview: Final REPEAT Project Findings on the Emissions Impacts of the Inflation Reduction Act and Infrastructure Investment and Jobs Act," REPEAT Project, April, 2023

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# The new challenge: how do we mobilize a nation to build energy infrastructure at scale?



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## **Clean electricity: the linchpin**

#### Total annual U.S. electricity generation by resource

Billion kilowatt-hours (or terawatt-hours)



## **Smashing new records**

Historical power generation capacity additions vs modeled Net-Zero Pathway gigwatts per year







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## We're going to need a bigger grid



## This isn't impossible...



Data source: REPEAT Project, Net-Zero Pathway and Cembalest (2022), "Eye on the Market 12th Edition: 2022 Annual Energy Paper" p.12.

# ...but the price of failure is high



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# EVs (and More) Are Plugging In



#### **New Demand, New Patterns**

New Jersey Electricity Demand Profile, Stated Policies Scenario\*



\*100% carbon-free electricity by 2050, economy-wide 80% below 2005 emissions limit, see https://zenodo.org/record/6386823

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## **But We Have Time to Prepare**

#### Modeled US EV and PHEV sales and stock shares Light duty vehicles



Medium & heavy duty vehicles



## **Unlocking Demand Flexibility Will Be Key**

US electric cars sold in 2022 averaged 291 miles range

That's 7 days of the average American's daily commute

An EV battery offers enormous flexibility to shift charging patterns to avoid stressing the grid...

... if properly incentivized.

# **Unlocking Demand Flexibility Will Be Key**



Unlocking flexible EV charging and water heating could reduce New Jersey peak demand by 17% (>6 GW) in 2050.

# BULD... BULD... BULD





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